

MARINE REVIEW.

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No. 3.

Light Coal Shipments to Lake Superior.

Probably the most interesting feature of St. Mary's Falls canal reports since the opening of navigation is the summary of coal shipments presented herewith. The reports show that during May and June of this year (the canal was open only a few days in April) the shipments of bituminous coal amounted to 229,757 net tons, against 59,724 net tons for the same period in 1894, or a gain thus far this season of 170,033 tons. On the other hand there is a decrease of 106,446 tons this season in anthracite shipments through the canal to July 1. These figures represent a very light movement of coal of both kinds. The increase in bituminous shipments, notwithstanding the light movement, is due entirely to the fact that up to this time a year ago soft coal miners of Ohio and Pennsylvania were on a strike, and the coal trade of the northwest had been depending on stocks carried over at Duluth and Superior from shipments of 1893. Tables that follow give the coal movement and the canal traffic in detail:

COAL MOVEMENT TO LAKE SUPERIOR PORTS.

	To July 1, 1895.	To July 1, 1894.
Bituminous, net tons.....	229,757	59,724
Anthracite, net tons.....	81,304	187,751

ST. MARY'S FALLS CANAL TRAFFIC—OPENING OF NAVIGATION TO JULY 1, SEASONS OF 1894 AND 1895.

EAST BOUND.

Freight items.	Designation.	1894.	1895.
Copper.....	Net tons.....	29,822	36,180
Corn.....	Bushels.....	1,164,057	
Building stone.....	Net tons.....	6,333	8,773
Flour.....	Barrels.....	2,571,620	2,682,225
Iron ore.....	Net tons.....	2,162,332	2,540,702
Iron, pig.....	Net tons.....	6,115	7,456
Lumber.....	M. ft. B. M.....	212,814	223,937
Silver ore.....	Net tons.....	372	
Wheat.....	Bushels.....	7,736,380	6,246,961
Unclassified freight.....	Net tons.....	43,118	42,131
Passengers.....	Number.....	2,765	3,434

WEST BOUND.

Coal, anthracite.....	Net tons.....	187,751	81,304
Coal, bituminous.....	Net tons.....	59,724	229,757
Flour.....	Bushels.....	753	150
Grain.....	Bushels.....	500	18,250
Manufactured iron.....	Net tons.....	8,121	20,439
Salt.....	Barrels.....	64,825	90,350
Unclassified freight.....	Net tons.....	76,393	83,742
Passengers.....	Number.....	2,662	3,066

Higher Range of Prices—The Labor Question.

"I am not opposed to the present tendency to advance prices, labor included," said James Corrigan of Cleveland a few days ago. "We have been trying to do business," he added, "on a basis that has been entirely too low. A change of affairs is at hand, and I think now that there should be a division of profits in all cases where conditions warrant it, although I have always fought as hard in the other direction when conditions were against the ore and vessel interests."

Mr. Corrigan was discussing the recent increase in the wages of ore handlers and the advance of 1½ cents a ton made in the charge for unloading ore vessels. The advance in the charge for unloading ore will reduce, to some extent, the little profit that is to be had from carrying ore on 75 and 80-cent contracts, but it is evident from the feeling favorable to a higher range of prices that losses in some branches of the lake trade must be charged up to transactions that did not take into account the more prosperous conditions now prevailing. It is evident also that a demand from all employes on lake vessels for higher wages will follow the general movement in that direction.

The MARINE REVIEW of Cleveland, Ohio, is always in the lead of maritime papers. A recent issue contains photos and lithos of the new lake steamer North Land. These are works of art which do credit to our lake contemporary and an honor to lake shipping interests.—Coast Seamen's Journal, San Francisco.

F. W. Wheeler & Co's. Big List of Contracts.

The aggregate value of orders for new ships now held by F. W. Wheeler & Co. of West Bay City, Mich., is full \$2,250,000 and the boats will carry no less than 22,000 gross tons on 14 feet draft. There are seven boats, all steamers and all of steel, as follows: Two 400-foot ore carriers for Eddy Bros. & Shaw of West Bay City; two lumber carriers for McCormick Bros.; one 400-foot ore carrier for Dr. Roby and others of Detroit; one steamer 378 feet over all for D. C. Whitney of Detroit, and a steamer 386 feet over all for John Mitchell of Cleveland, and others.

Four of these boats, the two lumber carriers and the Eddy-Shaw steamers, have been on the stocks for some time past, but one of the latter will be launched within a few days, making room for the Roby boat. The putting down of keels for the Whitney and Mitchell boats will be delayed but they are not to be out until the opening of navigation next spring. The Whitney boat, although patterned after the Merida and Curry, and not designed particularly as a racer, will very probably be the fastest ore carrier on the lakes, as she is to have finer lines than any boat as yet built for that trade.

Proclaiming Advantages of the New C. & B. Steamer.

The Cleveland & Buffalo Transit Company has issued a circular descriptive of the new side-wheel steel steamer, which they are to bring out next season and which is now under way at the Wyandotte yard of the Detroit Dry Dock Co. It is, of course, well understood that the dry dock company is to make this boat the finest side-wheeler on the lakes. The owners are not very modest about proclaiming her advantages, but this may be pardonable, as she is to be about 8 feet longer than either of the big boats of the Detroit & Cleveland company and will have probably 30 per cent. more power. The circular issued by the company has the following regarding her power:

"Engines will be of the compound beam type, with a low pressure cylinder 80 inches in diameter, and stroke of 12 feet; with Sickie's valve gear which will cut off at any point of the stroke, while the engine is in motion. Also a pressure feed water heater, of sufficient capacity to condense steam from all of the engines, some sixteen in number, thereby heating the water to a very high temperature, before feeding it into the boilers. For comparison of power, it may be stated, that no steamer of this class on the lakes has a cylinder to exceed 68 inches. The boilers will be of cylindrical type, six in number, any four of which will furnish ample steam for all purposes. The Howden hot draft system, giving an equal pressure of steam under all conditions, will be applied. The wheels will be of the feathering type, extra strong, with steel buckets. The electric light plant will have capacity for 1,500 lamps, together with a search light."

It is expected that the boat will be capable of carrying 800 tons of freight, all of which may be loaded on the main deck, and the passenger capacity in state rooms and single berths combined is figured at 600.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on July 13, 1895:

	Wheat, bushels.	Corn, bushels.
Chicago.....	16,871,000	2,370,000
Duluth.....	7,268,000	
Milwaukee.....	190,000	
Detroit.....	264,000	114,000
Toledo.....	252,000	285,000
Buffalo.....	1,182,000	238,000
Total.....	26,027,000	3,007,000

As compared with a week ago, the above figures show at the several points named a decrease of 800,000 bushels of wheat and 1,995,000 bushels of corn.

Referring to the advisability of all vessels carrying some kind of a wreck-indicating buoy, C. W. Elphicke & Co., insurance and vessel agents of Chicago, say: "We had not given the matter much consideration, but it strikes us it would be a very excellent arrangement, locating wrecks and saving a good deal of time and expense in hunting for them. We hope some device may be struck upon where the expense is light that will be universally adopted by lake vessels."

Another Collision Case with a Division of Damages.

It would seem that the vessel captain who will stop and back his engines every time there is the remotest possibility of a collision of any kind will best serve his owners, or the underwriters carrying a risk on the vessel. Another collision case, that of the Leatham & Smith Wrecking & Towing Co. of Sturgeon Bay, Wis., owners of the steamer Thomas H. Smith, against C. W. Elphicke & Co. of Chicago, owners of the steamer Arthur Orr, has resulted in a division of damages. The decree is from United States District Judge Seaman of Milwaukee. The collision in which the Smith was sunk occurred near Racine, Wis., on the night of Nov. 11, 1893, in a dense fog. The Orr had been fitted up for world's fair passenger traffic, and was on her first trip as a freight steamer, after her temporary cabins had been removed at Milwaukee, when the collision occurred. The owners of the Smith sued for \$25,000.

In ordering a division of damages Judge Seaman held that the Orr had been travelling too fast and was at fault in that she did not stop when she failed to clearly understand the Smith's signals. On the other hand, the Smith had failed to stop when she heard the Orr's signals, and instead, had ported and swung across the Orr's bows. She should have waited until she fully understood the Orr's signals before changing her course. Under the circumstances he could not hold that it was a maneuver in extremis, which could be excused. An interesting point was raised by counsel for Smith to prove negligence and responsibility on the part of the Orr. The collision occurred, as stated, in a dense fog. The Smith left Chicago before the fog settled down, but the Orr left Milwaukee in the thick of it. The point raised was that the master of the Orr had been guilty of negligence in leaving port in a fog. Judge Seaman decided that it was not negligence. He said that he was satisfied that leaving port in a fog could not be held to be per se negligence. The law as he understood it allowed a vessel to leave in a fog, but constrained her to the utmost care to avoid collisions.

Advantages Offered at Geneva for a Harbor.

Editor of MARINE REVIEW: In your issue of July 11, under the head of "Miscellaneous Mention" appears a quotation from a local paper at Geneva, which was written in connection with the effort of the steamer Iroquois to land at Sturgeon point, having mistaken a gas well for the Ashtabula light. With reference to the matter of a harbor at Geneva, permit me to say that the Cowles creek, so called, empties into Lake Erie near the west line of Geneva. At its mouth is a marsh containing about sixty-five acres, which has two openings into the lake with a bluff 12 feet high between them. The bank of the marsh is from 5 to 8 feet high and the distance around it is something over a mile.

The entrances to the lake from the marsh are 100 rods apart. The depth to the rock at the western entrance is 14 feet and at the eastern entrance 13 feet. Soundings have been taken every 50 feet in the marsh and the depth to the rock varies from 11 to 14 feet. The banks are of solid clay. This point on Lake Erie is one mile and a quarter nearer to Austinburg, a station on the Youngstown railroad, than Ashtabula harbor is. Several surveys have been run from this point to Austinburg, and for the first four miles and a half the heaviest grade is only 13 feet to the mile. The heaviest grade between this point and Austinburg is only 27 feet to the mile, and this continues for only one mile and one half, while in going from Ashtabula harbor to Austinburg the grade is heavier than this all the way until you reach the summit about three miles north of Austinburg, and in one place the grade is nearly three times 27 feet. While this local paper assumes that Geneva has no harbor, who shall say that sometime we shall not see vessels arriving at Geneva and ore and coal trains running to and from Austinburg and thence to the furnace sections?

O. C. PINNEY,

Cleveland, O., July 15, 1895.

Around the Lakes.

One of the two big steamers building by Wheeler & Co. for Eddy Bros. & Shaw will be named Penobscot.

The Grummond tug Swain of Detroit towed down the Detroit river, a few days ago, a raft containing 12,000 telegraph poles, 25,000 railway ties and 50,000 posts.

Capt. John Saunders, vessel owner of Kingston, was drowned in the St. Lawrence river Tuesday while engaged in directing dredging operations for the Canadian government.

A representative of the German government is going the rounds of lake shipyards seeking information relative to the construction of car ferries for winter navigation in Prussia.

It is said that either of the big steamers, Victory and Zenith City, built in South Chicago could not now be duplicated for less than \$20,000 over the contract price of last winter.

All lake builders are suffering from the delay in getting material out on the part of the rolling mills. Most of the mills have specialties other than marine work, and they prefer to first supply the demands of their

regular customers, now heavy, rather than cater to the wishes of the lake people, whose trade has been uncertain of late.

Postmaster Enright of Detroit has obtained authority from the post-office department to supply vessels passing up and down the river with weather bureau bulletins regarding storms.

Ferdinand Schlesinger did not succeed in gaining control of the Eureka mine. He was willing to pay the price asked for the property but could not make terms of payment satisfactory.

Capt. J. L. Beckwith, who began sailing away back in the thirties, and who was of late associated with P. H. Fleming & Co., Chicago insurance agents, died Monday in Chicago. He was seventy-one years of age.

Post office business at the St. Mary's Falls canal during the past year increased in proportion to other traffic connected with the canal, and exceeded the amount of mail handled during the previous fiscal year by 25,930 pieces.

The Davidson steamer City of Glasgow towed down the lakes recently the schooners Aberdeen, Dundee, Grampion and Paisley. The total length of this tow must have been fully 3,500 feet. All of the boats are modern wooden ships.

It is expected that the Standard Oil Co. will inaugurate its tank barge system of carrying oil in bulk on the lakes by loading a boat this week at Whiting, near Chicago, with oil that is to go to Superior, Wis., for distribution throughout the northwest. One of the boats built by the American Steel Barge Co. has been at South Chicago for some time past, but delay has been encountered in running out into the lake from Whiting the system of pipes that are to be used in loading the vessels.

Shipments of lumber from Duluth and Superior thus far this season have already amounted to about half the entire movement for the navigation season of 1894. If the next four months average just about the same as May and June, the total lake movement for the year will reach 240,000,000 feet. But it is altogether probable that the movement will be larger than that. The lake movement at Ashland continues to be very heavy, Chequamegon bay shipments so far being larger than those for Duluth and Superior.

Mr. F. W. Wheeler, who was in Cleveland a few days ago, says that it is not the intention to depart from the usual practice in the freight steamer which he is to build for D. C. Whitney of Detroit. The boat will be similar to the Merida, Curry and Centurion. Mr. Whitney is of the opinion that such a boat, being somewhat faster than the 400-footers, may be operated in his fleet to advantage, by attention being given to her time in port, so as to have her reach the Sault river and canal when delays will not be encountered.

The Grand Haven Co-operative Ship Yard Co. is the name of a new concern that will engage in ship building and repair work at Grand Haven, Mich., having leased for a term of years the plant formerly operated by the Grand Haven Ship Building Co. The new company is composed of six ship yard mechanics, who are competent to build and repair ships of medium size, having good facilities for this class of work. The men are all capable and well known in Grand Haven, and with the patronage which they deserve they will make a good record for themselves.

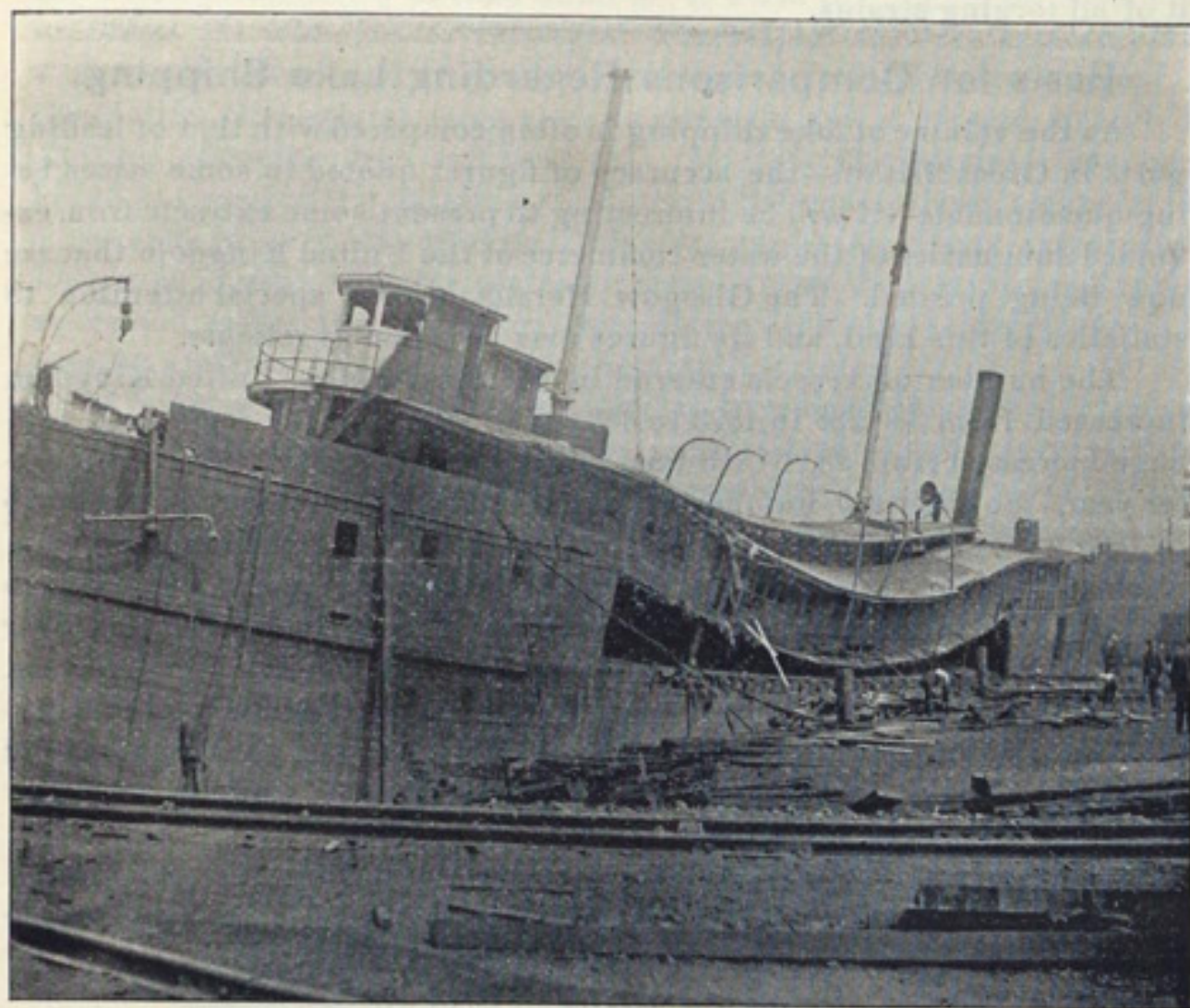
It would seem that the International Longshoremen's Association of the United States, which concluded a general meeting at Milwaukee a few days ago, is growing to large proportions on the lakes. It was decided at the Milwaukee meeting to affiliate with similar organizations in Canada. Officers elected are: President, Charles Kelley, Ashland; second vice-president, J. Schmidt, Sandusky; third vice-president, P. R. Beach, Port Huron; secretary and treasurer, H. C. Barter, Detroit; delegate to the convention of the Federation of Labor, Daniel Keefe of Chicago. Escanaba was selected as the meeting place for the convention in 1896.

When the steamer Pascal P. Pratt went ashore on False Detour recently the wrecking steamer Favorite, Capt. Mart Swain, was telegraphed for and arrived there some hours after the happening. The stern of the Pratt lay in 22 feet of water, and she was full of water. The diver was worked half a day, stopping some leaks. Capt. Swain sent to Cheboygan for men. Three pumps were set up, the boat was pumped out, 300 tons of her coal cargo was lightered and jettisoned, and the steamer was released. All this took place in less than twenty-four hours from the time of arrival of the Favorite.—Detroit Free Press.

A Cleveland vessel owner wearing razor-toe shoes of the latest type was brought up with a round turn, in the Perry-Payne building a few days ago, by an ambitious insurance agent, who proposed writing a collision clause on the new style of foot gear.

A CHART COVERING LAKE HURON, GEORGIAN BAY AND THE STRAITS OF MACKINAC, ALL ON ONE SHEET, HAS BEEN ISSUED BY THE HYDROGRAPHIC OFFICE AND MAY BE HAD FROM THE MARINE REVIEW AT 75 CENTS. LAKE SUPERIOR ON ONE SHEET IS ALSO IN PRINT AND SELLS AT THE SAME PRICE.

Wrecked Steamer St. Magnus.



The illustration represents the Canadian steamer St. Magnus, after being raised from the bottom of the river near the piers in Cleveland harbor. This is the steamer of the Merchants Montreal line, which turned over and sank while being loaded with pig iron. She has been declared a constructive total loss, but no settlement has as yet been made with the underwriters. The engraving was made from a photograph taken by W. H. Mack.

Care of Sick and Disabled Seamen.

Contracts have again been made by the United States marine hospital service for the care of sick and disabled seamen at different points throughout the country, and vessel masters, as well as all employes aboard lake vessels, will be interested in the list of surgeons, hospitals, etc., for lake ports, which is as follows:

Lake Ontario: Oswego—Medical attendance by an acting assistant surgeon, and Oswego hospital to furnish quarters, nursing, medicine, etc. Ogdensburg—Acting assistant surgeon; city hospital to furnish quarters, etc.; L. McGillis to provide for burial of deceased patients.

Lake Erie: Buffalo—Medical attendance by an officer of the marine hospital service; Buffalo hospital to furnish quarters, etc., and to provide for burial of deceased patients. Erie—Medical attendance by an acting assistant surgeon; Harnot Hospital Association to furnish quarters, etc.; W. J. Quinn to provide for burial of deceased patients. Ashtabula—Medical attendance by an acting assistant surgeon; Mrs. Henry Whelpley to furnish quarters, etc.; John Ducro & Sons to provide for burial of patients. Cleveland—Medical officers of the marine hospital service in charge; Cleveland City Hospital Association to furnish quarters, etc. in United States marine hospital under lease; Flynn, Abel & Froelk to furnish ambulance service and provide for burial of patients. Sandusky—Medical attendance by an acting assistant surgeon; Good Samaritan hospital to furnish quarters, etc. Toledo—Medical attendance by an acting assistant surgeon; Toledo hospital to furnish quarters, etc., and to provide for burial of deceased patients.

River points: Detroit—United States marine hospital for care of all patients, and dispensary at No. 90 Griswold street; Ed. H. Patterson to provide for burial of deceased patients. Port Huron—An acting assistant surgeon for medical treatment; Hospital and Home to furnish quarters, etc.; J. W. Kelley to provide for burial of deceased patients. Sault Ste Marie—Medical attendance by an acting assistant surgeon; quarters, care, nursing, etc., by Annie McNieley; burial of deceased patients by J. Vanderhook.

Lake Huron: Saginaw—Quarters, etc., to be provided by St. Mary's hospital and medical attendance by an acting assistant surgeon.

Lake Michigan: Chicago—United States marine hospital for care of all patients; H. Bartlett to provide for burial of deceased patients. Milwaukee—Quarters, nursing, etc., to be provided by St. Mary's hospital and medical attendance by an acting assistant surgeon; burial of deceased patients by St. Mary's hospital. Grand Haven—An acting assistant surgeon for medical attendance; care, nursing, etc., by Annie Farnham. Manistee—Quarters in Mercy hospital and attendance by an acting assistant surgeon. Michigan City—Medical attendance by an acting assistant surgeon, but seamen requiring hospital treatment must make application at the United States marine hospital at Chicago. Ludington—Hannibal D. Lindsley to furnish quarters, nursing, etc., and an acting assistant sur-

geon for medical attendance. Escanaba—Delta County hospital to provide quarters and an acting assistant surgeon for medical attendance. Green Bay—Montrose hospital to provide quarters, subsistence, etc., and an acting assistant surgeon for medical attendance.

Lake Superior—Ashland—St. Joseph's hospital to provide medical attendance, quarters and care of all patients and to look after burial of deceased patients. Marquette—St. Mary's hospital to provide for all attendance excepting medical, which will be furnished by an acting assistant surgeon. Duluth—Medical attendance by an acting assistant surgeon; quarters, subsistence, etc., by St. Luke's hospital; burial of deceased patients by John W. Stewart.

A Legislative Programme.

Secretary Keep of the Lake Carriers' Association is in Cleveland today (Thursday) mapping out, with other executive officers of the association, a programme relative to legislation that will be sought from congress during the coming fall and winter. Although the association has not in the past taken a very active part in the waterways conventions that have been held in Detroit, Toronto and other places, it is very probable that the vessel owners, not as an organization, but as individuals most interested in lake commerce, will be found in large numbers in the waterways convention to be held in Cleveland in September next. There is no special object in encouraging representation in the convention, further than the fact that these big meetings have been carried on in the past without a great deal of assistance from practical vessel owners. The vessel men have not taken as much interest in the big question of a deep waterway to the Atlantic as they have shown in the more important work of their own association, which deals with matters nearer at hand. It is probable, however, that the drainage canal question and other similar subjects will come up at the Cleveland convention, and the vessel owners ought to be fully represented when these matters are being discussed—not for the purpose of controlling any action of the meeting, but to exchange practical ideas with the engineers and representatives of commercial interests who will be in attendance.

The disposition of delegates in the waterways convention might also be favorable to action on the raft towing question, and assistance of any kind on this score will be welcomed by the vessel owners, who are bound to have legislation on raft towing during the winter. A leading vessel owner referring to this subject a few days ago said:

"We propose to get legislation peaceably if we can, forcibly if we must, but restrictions and regulations on raft towing we will have. It will be much better for the lumber men to agree to what is reasonable and proper than to fight over it, as I think we will be able to convince them in a courteous but decided manner, before congress assembles, that we are in earnest, and that the facts will be so presented to congress as to not admit of the repetition of any such shrewd move as that made by Gen. Alger last winter."

Lake Freight Matters.

If it were not for the strike of ore miners at Ishpeming and Negaunee, which has greatly reduced ore shipments from both Escanaba and Marquette, the rate on ore from the head of Lake Superior would very probably have been advanced on Monday last. The strike has diverted vessels to Duluth, Two Harbors and Ashland, and rates are practically as they have been for two weeks past, with very little grain as yet showing up for shipment. The ore strike will probably be settled without great delay, and anyhow there are no indications of a backward movement in freights. Vessel owners claim that they have been offered 90 cents on ore to be carried from the head of the lakes during August and 95 cents for September.

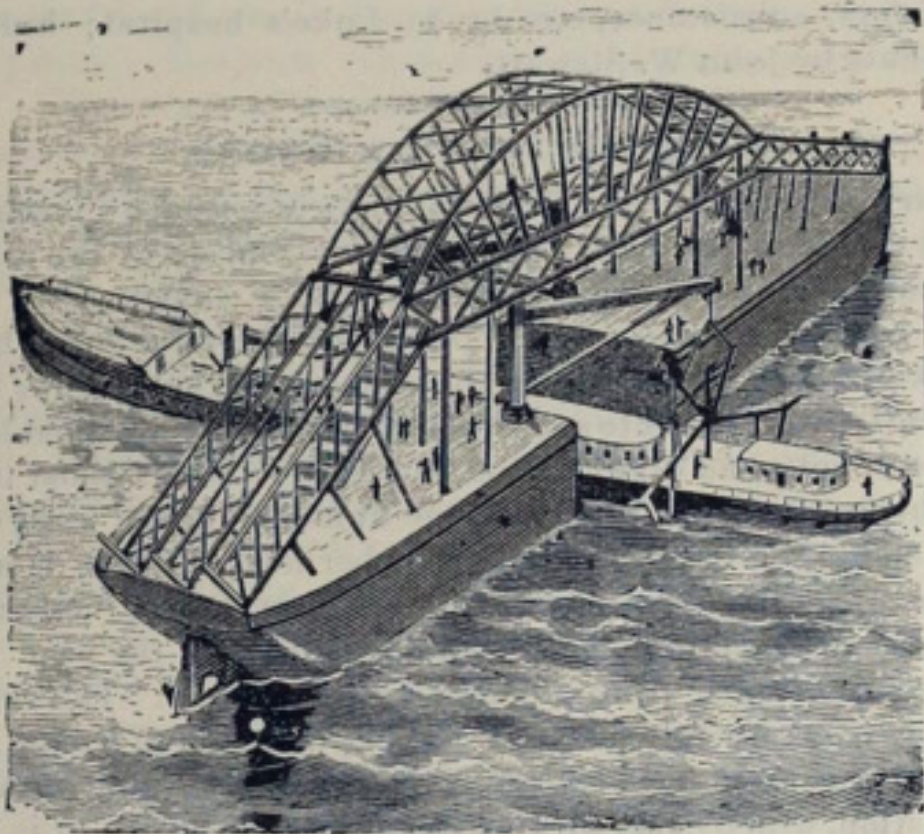
In accordance with the plans of Chief Engineer Fraser of the Northern Steamship Company for a series of tests of the twin-screw passenger steamers North West and North Land, new wheels are to be fitted to the boats. Steel buckets will be used. On her last trip up the lakes, from Buffalo piers to Duluth piers, the propellers of the North Land made together 676,943 revolutions. On the down trip the number of revolutions was 679,369, of which 340,160 were credited to the port engines and 339,209 to the starboard engines. For the same trip up, and while steering practically the same course, engines of the North West, the other boat, are reported to have made about 1,000 more turns with little difference in speed.

Capt. E. M. Peck's pet steamer, the Harvey H. Brown, which is fitted with Howden hot draft and is the best freight steamer built by the Detroit Dry Dock Company, is reported to have made the run from Sault Ste. Marie to Ashland, 360 miles, on her last trip up the lakes, in twenty-one hours, or at the rate of 17.14 miles an hour.

CAPTAINS AND MATES ARE INVITED TO CALL AT THE OFFICE OF THE MARINE REVIEW, AND LOOK OVER THE SAILING DIRECTIONS OF LAKES SUPERIOR, HURON AND MICHIGAN, PUBLISHED BY THE HYDROGRAPHIC OFFICE.

Schon's Apparatus for Raising Sunken Vessels.

Hubert Schon of Allegheny, Pa., has been in Cleveland during the past few days, endeavoring to open up negotiations with underwriters with a view to raising the steel steamer Cayuga, sunk near the Straits of Mackinac. The illustration represents Schon's apparatus, which is a two-part hull, with the parts rigidly connected with each other by an overhead framework, on which hoisting devices are carried. The apparatus does not seem suited to work where a moderate seaway might be



encountered, but the inventor makes a great many claims regarding the strength of the structure. He has financial support from a company recently formed in Allegheny. The hull parts of the structure support at their adjacent ends swinging cranes which carry grappling devices adapted to be raised and lowered by a hoisting chain. The grappling arms are held in extended or open position when being lowered to raise a vessel, but on contact with the vessel the arms are unlocked and the grappling hooks approach each other and engage the hull of the vessel. The chains are drawn up by windlasses on the cranes to raise the vessel. An indicator denotes the engagement of the grappling forks with the vessel. The precise construction shown in the illustration may be varied according to the work, and the raising apparatus may be made to raise stones and sand. If the company controlling these patent rights should, for instance, make an arrangement with the underwriters to try to raise the Cayuga, they say their plan would be to erect the bridge work and cranes on two separate hulls, instead of putting the apparatus on two sections of a single hull, as shown in the engraving. They would then have on the lakes, they say, a wrecking plant that could be used for raising other wrecks. An apparatus is also provided for locating sunken ships.

Hollow Forged Steel Shafts.

Ship and engine builders on the lakes, whose attention has been directed to hollow forged steel shafts, will be interested in knowing that the Edward P. Allis Co., Milwaukee, will furnish for the Cicero & Proviso Electric Railway Co's power plant shafts of this kind made by the Bethlehem Iron Co. The severe shocks to which electric railway engines are subjected make it necessary that every precaution should be taken against the breaking of their shafts. Mr. Yerkes and his associates, appreciating this fact, have been willing to pay the difference between the price of solid and hollow forged shafts, considering such investment to be in the nature of insurance against accident. The Bethlehem Iron Co. is the only concern in this country equipped to make fluid compressed steel, which is the material necessary for hollow forged work. All the shafts for the navy and transatlantic steamers are made hollow, and many engine builders are now adopting this form, not only because it is safer, but because for the same strength a lighter shaft is obtained.

The ordinary solid wrought iron shaft is made by hammering together at a welding heat small pieces of scrap iron, thus building up the shaft to the proper diameter and length. The ingot from which hollow steel shafting is made is cast in a vertical mould about twice the diameter of the finished shaft. The lining of this mould is perforated. The metal, while fluid, is then subjected to hydraulic pressure of 7,000 tons, which remains on it until the ingot is cold. This process of fluid compression completely obliterates blow holes and cracks, and makes the metal practically homogeneous. A sufficient volume of metal is cut off of this ingot to forge out to the length of the proposed shaft, and a hole the size of that in the finished hollow forging is bored through it. The piece is then reheated, a mandril the size of the finished hole run through it, and then it is forged out to the necessary length under presses varying from 7,000 to 14,000 tons capacity, as may be required. The steam hammer is not used in any of this work, as the blow is apt to produce

only surface impact. After the forging is finished it is placed in an annealing furnace and heated and allowed to cool slowly, thus relieving it of all forging strains.

Basis for Comparisons Regarding Lake Shipping.

As the volume of lake shipping is often compared with that of leading ports in Great Britain—the accuracy of figures quoted in some cases being questionable—it will be interesting to present some extracts from extended summaries of the water commerce of the United Kingdom that are now being printed. The Glasgow Herald devotes special attention to statistics of this kind, and its figures may be taken as reliable.

The number of vessels entered in the ports of the United Kingdom increased from 380,288 in 1893 to 388,847 in 1894, and the registered tonnage increased from 88,964,468 tons in the former to 94,387,371 in the latter year. So the total number of vessels clearing increased from 346,175 in 1893 to 354,891 in 1894, and the tonnage of such vessels increased from 83,216,391 tons in the former to 88,497,509 in the latter year. The tonnage for 1894, it will be seen, shows an increase of over 10,000,000 tons over that for 1893, an increase more than double that for the previous year. In 1850 the total entrances and clearances at the ports of the United Kingdom were under 40,000,000 tons. By 1870 they had not got much beyond 70,000,000. But in 1880 they ran up to 133,000,000 tons, while by 1890 they had more than quadrupled.

The foregoing figures include, of course, both domestic and foreign trade, but if the foreign trade is presented separately the same steady increase is found, as shown by the following summary:

FOREIGN TRADE—ENTERED.

	Vessels.	Registered tonnage.
1894.....	61,931	39,818,019
1893.....	59,916	37,141,938
1892.....	61,947	37,672,904

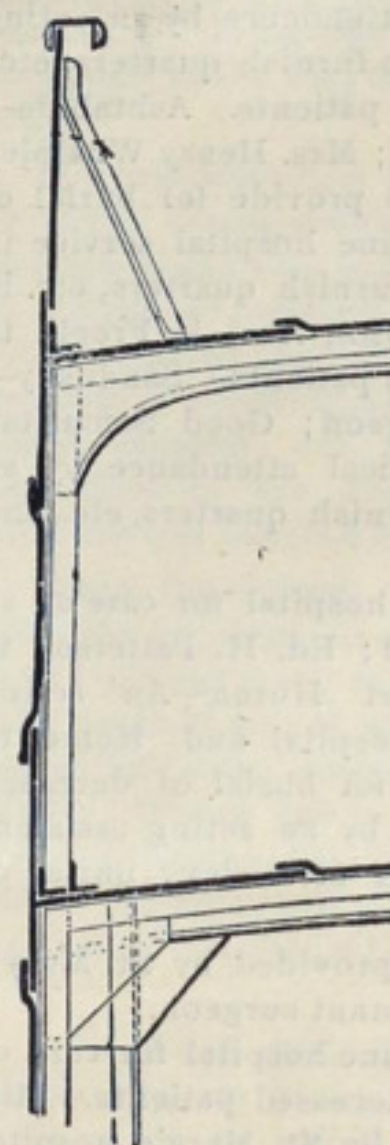
FOREIGN TRADE—CLEARED.

	Vessels.	Registered tonnage.
1894.....	62,237	40,718,846
1893.....	59,918	37,400,909
1892.....	61,881	38,194,251

Among the ports of the United Kingdom, London continues to hold first place in regards the tonnage of combined entrances and clearances, Liverpool coming second, and Cardiff a close third and the Tyne ports fourth. As regards the tonnage of vessels registered at the respective ports, Liverpool stands first and London second.

New Method of Fitting Shell and Deck Plating.

Reference was made in the REVIEW some time ago to a new method of applying shell plating to ships, which has been adopted by William Doxford & Sons, well known ship builders of Sunderland, England.



Engravings just published in the Engineer of London enable us now to describe the process, which is of advantage mainly in dispensing with packing or lining pieces throughout, and at the same time securing an equally neat, light and strong job. Labor and material have been saved in ship construction in the past by sectional framing, or framing of one entire section in place of two or more riveted combinations; by plates of great length and breadth, saving butts and landings; by overlapped in place of strapped butts, and by cold flanging of plate edges, in place of angle connections.

Now in this new system, which saves packing, another improvement is to be introduced. Packing does not contribute to strength, but is merely an addition to weight, the absence of which is very much better than its presence; provided the structural items proper can be manipulated so as to bear closely "metal to metal." At present, the shell and deck plating, with strakes worked on the usual raised and sunk, or "in-and-out" principle, have packing or filling slips fitted on every frame or beam, behind the outside or raised strakes.

The new system dispenses with all such fillings, the improvement being effected by joggling or kinking the edges of each outside strake of plating over the edges of the adjoining inner strakes; every strake thereby being brought right home to the frames or beams without any intervening liners. For the joggling or kinking of the plate edges, the English builders have invented the machine illustrated herewith. This machine is now in operation and is said to be accomplishing in every-day work all that is required of it. The edges of the plates forming the outside strakes,

as will be seen from the illustration, are run through between rollers, working in a gap of the frame of the machine, which rollers are so shaped and adjusted relatively to each other as to form the joggle or indent required as the plate passes through. The system has been applied partially to one vessel, and to another just launched it has been applied to the plating throughout, from keel to gunwale, and from end to end, including, of course, deck and tank top. No difficulty whatever has been found in carrying the joggling right out to the ends, where, owing to the curve and twist of the strakes, difficulty might have been anticipated. This even applies to outer plates, or those under the counter, and plates above and below the propeller boss, as no difficulty is experienced in passing plates of any set through the joggling rolls.

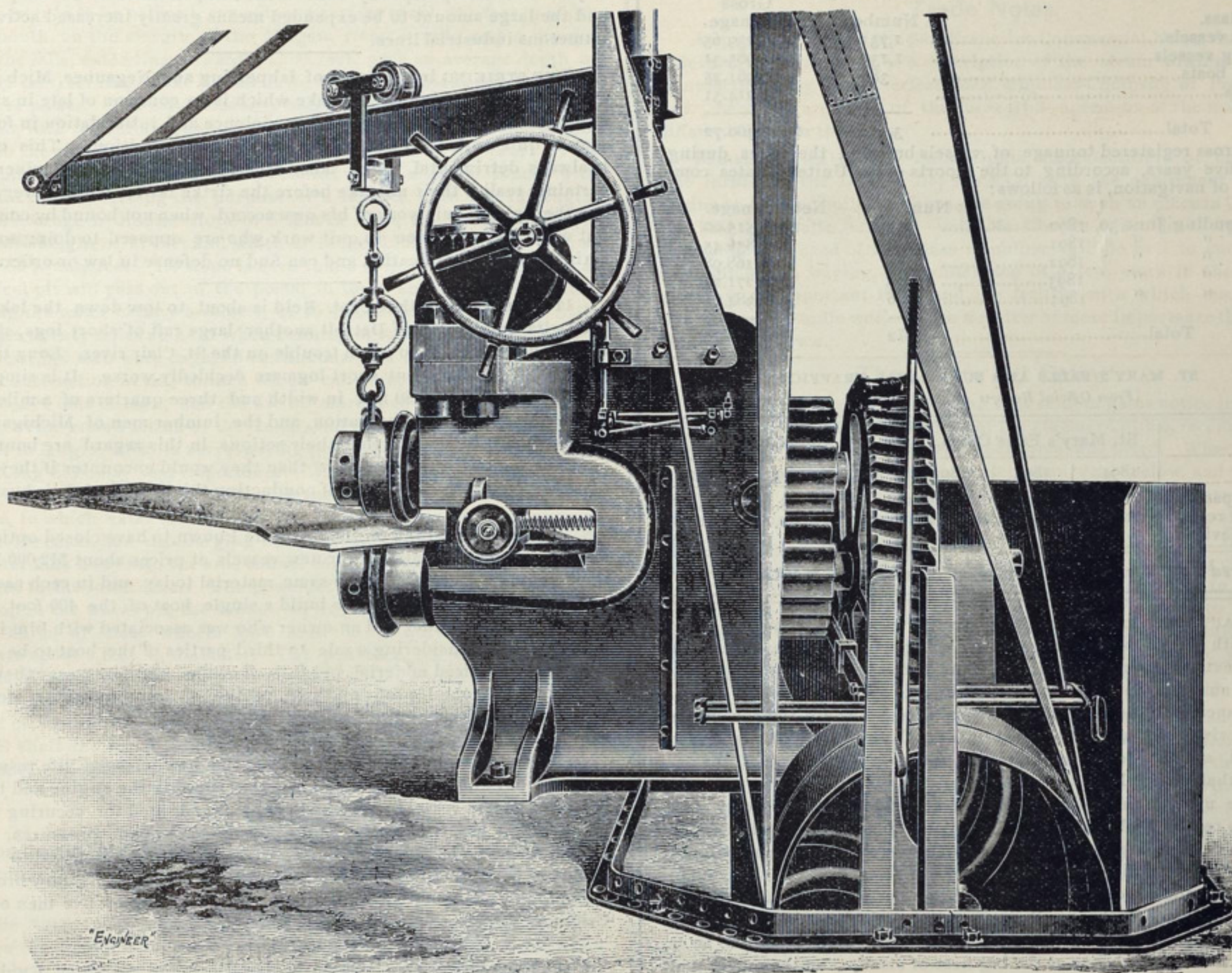
A few particulars of the saving said to have been effected in labor and weight of material, and of consequent gain in dead weight carrying capability obtained will be of interest. The vessel just finished is of 2,700 tons register, the total weight of metal worked into her structure being about 1,300 tons. As compared with a similar vessel in which the joggling system had no place, there has been a saving in weight of hull of about

by this system in a vessel of 2,700 tons register over a vessel of the same size built on the ordinary principle, is a consideration which ship owners will be glad to note and appreciate.

As regards the important question of structural strength, it is quite obvious the system affects it only for its betterment. The ideal in structural work of "metal-to-metal," without packings or filling of any kind, is attained, and the joggling especially, when carefully carried out, being in the nature of a corrugation of the plating, adds to the rigidity of the material.

The New Composite Gunboats.

The six composite gunboats for which the navy department has just completed all details, are to cost not over \$230,000 each and to be of 12 knots speed. Not more than two will be built by any one concern. The six vessels will be of two radically different types, one type carrying full sail power and propelled by a single screw, the other type having steady-sails only, and propelled by twin screws actuated by two separate engines. The principal dimensions of the single screw type are as follows:



MACHINE FOR JOGGING SHIP PLATES TO BE APPLIED UNDER A NEW SYSTEM OF CONSTRUCTION.

thirty-eight tons, or a net gain in material saved of 2 per cent. Three-fourths of this total is made up of the weight of packing and liners dispensed with, and close on one-fourth of it by the weight of cement saved, owing to the outer strake of plating on the bottom being brought up close to the frames. As regards labor, the gain is also clear and considerable. The work of riveting through two-ply of material is obviously less difficult and exhausting than through three-ply, as is the case when packing is present. The work of fitting, tapering, and punching the packing pieces and liners, is in itself no small item, and dispensing with it means, in the case of large vessels, a saving of some consequence. There is, of course, to be deducted from the total saving in labor and material the cost of joggling the plates by the special machine, which is said to be only about one-tenth of the total. The gain in carrying capability is not quite equivalent to the thirty-eight tons of material saved, because from this figure must be deducted some ten tons of loss in displacement due to the finer form of the hull caused by the inward indent given to the outer or raised strakes of plating by this system. The perpetual gain, however, of some twenty-eight tons carrying power secured

Length on load water line, 168 feet; beam, extreme, at load water line, 36 feet; draft, normal, to bottom of keel, 12 feet; displacement, normal, about 1,000 tons; I. H. P., 800 tons; speed, 12 knots. Dimensions of the twin screw type are the same, except that the length is 174 feet and the breadth 34 feet. The armaments, being identical in both types, will consist of six 4-inch, four 6-pounder, and two 1-pounder guns, all rapid fire.

The normal coal supply of the single screw boats will be 100 tons, with a total bunker capacity of 238; of the twin screw boats it will be 120 tons and 250 tons. When going under sail alone, the engines of the single screw boats will be uncoupled, allowing the shafting and screw to revolve simply by the action of the passing water; and so slight is the retarding influence of the screw thus disengaged, that there is every reason to expect a sailing speed fully equal to the possibilities of the steam power conditions. The essential reasons for the construction of vessels of the composite type are that they are largely independent of docking facilities, and economical in the use of fuel.

ALL NEW HYDROGRAPHIC CHARTS ARE KEPT IN STOCK BY THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
Total.....	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Net Tonnage.
1890.....	218	108,515.00
1891.....	204	111,856.45
1892.....	169	45,168.98
1893.....	175	99,271.24
1894.....	106	41,984.61
Total.....	872	406,976.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.
(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

CITY AUTHORITIES in Cleveland are now working along the right course with vessel owners, regarding a scheme of river improvements that is to extend through a period of years and involve regular appropriations in amounts as large as it is possible to secure from city funds. In accordance with the general opinion of vessel owners, improvements in the old river bed, where the great bulk of the ore and coal business is conducted, are put down as of first importance. Widening of the entrance to that channel and the removal of two old bridges that now obstruct free navigation are features of the general plan of improvements that are to receive early attention. The plan of placing this matter in the hands of a commission of vessel owners and business men, who will not be influenced by politics, may be expected to work well if the city council will act upon their recommendations. Lake ports that are first to provide wide and deep harbors will secure most trade from the ships of 400 or more feet in length and 19 or 20 feet draft, which are certain to be as numerous a few years hence as the big fleet of smaller steel steamers that has been built up within an equally short period.

It is unfortunate that President Livingstone of the Lake Carriers' Association must, in accordance with an unwritten law of that organization, step down from the chief office after one year of service, which ends in January next, before the new United States congress will have fairly begun its work. Executive officers of the association are now mapping out a legislative programme. There is a prospect of settling the raft-towing question and hope of liberal appropriations for the lake lighthouse service from this congress, which is expected to favor shipping as well as all other big commercial and industrial interests. Mr. Livingstone has a knowledge of men and methods in Washington that would be decidedly helpful to the association. He will take part in planning the programme, however, and may also be expected to do his share in carrying it out after leaving the presidency.

A VISIT TO THE lakes is all that is necessary to convince government officials of the importance of lake commerce and the immense advantages derived from river and harbor improvements. Senator Blanchard, Congressman Henderson, and other influential representatives of the legislative department of the government made a trip up the lakes two years

ago and have since been among the strongest supporters in congress of appropriations for the lakes. Now Gen. Craighill, the new chief of engineers, spends a few days as the guest of Gen. Poe of Detroit, and returns to Washington to declare that the big works between Detroit and Lake Superior are the greatest in the world. He was convinced of the present inadequate facilities at Sault Ste. Marie, where the freight traffic this year will probably amount to 15,000,000 tons. Vessel owners will thank him if he will use his influence to hurry the completion of the new lock at the Sault.

RAILWAYS ARE the great consumers of steel and iron, and the announcement from Philadelphia that the Pennsylvania Company will this year spend about \$5,000,000 in the way of improvements, alterations and extensions to its property, is therefore of a very welcome kind. The Pennsylvania company is a leader in the railway business. Last year, owing to the depression in business, considerable work that had been mapped out by the Company was laid aside, and that which was under way was also stopped for the time being. The same is true of other railways. Now that prosperity has returned improvements will be pushed, and the large amount to be expended means greatly increased activity to numerous industrial lines.

THE STRIKING iron miners of Ishpeming and Negaunee, Mich., have started out by making the mistake which is so common of late in strikes of all kinds. They have resorted to violence and intimidation in forcing men to quit work who were satisfied with their positions. This course is always detrimental to the labor cause, and the Michigan miners will certainly realize their mistake before the strike is over with. Every man has the right to quit work of his own accord, when not bound by contract, but when he forces men to quit work who are opposed to doing so he is acting without justification and can find no defense in law or order.

IT IS understood that Capt. Reid is about to tow down the lakes for the Delta Lumber Co. of Detroit another large raft of short logs, similar to the one that made so much trouble on the St. Clair river. Long timber rafts are bad enough but short logs are decidedly worse. It is simply an outrage to put a raft 280 feet in width and three-quarters of a mile long in the way of general navigation, and the lumber men of Michigan will learn, when it is too late, that their actions in this regard are bound to result in legislation more severe than they would encounter if they were more reasonable in the matter of conducting this branch of their business.

TWO SHIP BUILDERS on the lakes are known to have closed options, a short time ago, on material for new vessels at prices about \$12,000 lower than would be accepted for the same material today, and in each case the quantity was just sufficient to build a single boat of the 400-foot type. In one case the builder and an owner who was associated with him in the purchase are considering a sale to third parties of the boat to be built from the low-priced material, and it is, of course, needless to say they will realize a good round profit on their forethought in purchasing steel on the eve of an advance in the market.

SOMETHING must be done to check the heavy loss of life resulting from the bursting of steam and hot water pipes in the engine and boiler rooms of steam vessels. Methods thus far adopted for securing these pipes, which are constantly being put under heavier pressures, have proved inadequate. The question, which has been discussed to some extent of late in Great Britain, France and Germany, is now brought home to our own navy through the terrible scalding of five men on the Ericsson, Tuesday, while that boat was under trial.

ALL COLLECTIONS of shipping statistics tend to show England's strong hold on the water commerce of the world. Great Britain commands about one-third of the ships and one-half of the tonnage afloat. The actual number of British-owned steamers and sailing vessels is 9,261, representing 11,807,010 tons, or an average of something over 1,200, while the British colonies possess 2,399 ships of 1,162,941 tons. All the remaining nations, in the aggregate, possess a total, in round numbers of only 15,500 ships, with the tonnage of 10,081,000.

WITH pig iron nearly \$4 a ton higher than the lowest price reached last winter, profits in the business must be very large at this time. Furnacemen will do well, therefore, to remember that they bought their ore this year at an advance of less than 25 cents over the lowest price ever recorded for ore, and even this slight advance was the basis of improvement in all branches of the iron business. They can afford to show a liberal spirit in coming into the market this fall to provide for next year's supplies of ore.

It has been understood for some time past that the 400-foot steel freight steamer, for which the Cleveland Ship Building Company is about to put down a keel, will be owned by a Cleveland vessel owner who is among the best-known men in the business.

What Makes Niagara Falls Power?

What makes Niagara Falls power possible is the fact that Lake Superior, Lake Michigan, Lake Huron and Lake Erie, with a combined area of 90,000 square miles, representing the reservoirs of some 250,000 square miles of watershed, are situated 600 feet above the sea level. The great volume of water falling over the vast territory flows on its natural course to the Atlantic ocean with but a slight descent, until it is brought into the narrow Niagara river, when, in the rapids just above the Falls, it declines 55 feet, and then, with a single plunge, drops into the abyss, 165 feet below. Eminent engineers have computed that 275,000 cubic feet of water pass over the falls every second, representing in theoretical energy over, 6,000,000 horse power. The idea of capturing this vast power and subjecting it to industrial uses had for many years been considered, but it was not until 1890 that definite steps were taken to bring it about, and in the short period of less than six years this, the greatest engineering feat of the nineteenth century, has become an accomplished fact, so that part of the power is now available.

The great power installation by which, for the present, about 50,000 horse power is to be utilized, comprises a surface canal, 250 feet in width at its mouth, on the margin of the Niagara river, a mile and a quarter above the falls, extending inwardly 1,700 feet, with an average depth of about 12 feet, serving water sufficient for the development of about 100,000 horse power. The solid masonry walls of this canal are pierced at intervals with ten inlets, guarded by gates which permit the delivery of water to the wheel pit in the power house at the side of the canal. This wheel pit is 178 feet in depth, and is connected by a lateral tunnel with the main tunnel, serving the purpose of a tailrace, 7,000 feet in length, with an average hydraulic slope of 6 feet in 1,060, the tunnel having a maximum height of 21 feet and width of 18 feet 10 inches, its net section being 386 square feet. Its slope is such that a chip, thrown into water at the wheel pit will pass out of the portal in three and one-half minutes, showing the water to have a velocity of $26\frac{1}{2}$ feet per second, or a little less than twenty miles an hour when running at its maximum capacity.

Over 1,000 men were engaged continuously for more than three years in the construction of this tunnel, which called for the removal of more than 300,000 tons of rock, and the use of more than 16,000,000 bricks for lining. The construction of the canal, and especially of the wheel pit, 178 feet in length, with its surmounting power house, were works of corresponding difficulty and importance. Wheels calculated to yield 5,000 horse power each, occupy a position in the wheel pit, 140 feet below the surface, to which water is conducted by a tube, or penstock, leading from the service canal, and discharging between the twin wheel, from which the water falls away into the side tunnel conducting it to the main tunnel and thus to the lower river. The power, of course, is developed through the drop in the wheel pit, the tunnel serving the purpose only of a tailrace. Three of these wheels have been built, and are now in place. They are about 5 feet in diameter. The penstock, $7\frac{1}{2}$ feet in diameter, is made of steel, and the constant pressure of its column of water, discharging between the twin turbine wheels, serves to support the entire weight of all the revolving parts, namely, the weight of the wheels, the vertical shaft and the revolving parts of the electric generator driven by the wheel.—Cassier's Magazine.

In General.

Corrigan, McKinney & Co. of Cleveland have obtained control of the Colby mine but Ferdinand Schlesinger has nothing to do with the property.

The American line steamer St. Louis is improving in speed. Her time on the second homeward passage, Southampton to New York, was 6 days, 8 hours and 47 minutes. The average speed was 19.17 knots an hour, against 18.38 knots on her first trip.

A new dry dock at Southampton, which is about to be opened by the Prince of Wales, and which was built to accommodate big Atlantic passenger ships, is 750 feet in length, 112 feet in breadth at the top and 87 feet 6 inches at the bottom. The width at the entrance is 91 feet, and the depth from cope to floor is 41 feet. Its construction has occupied exactly two years.

This item from an English exchange is indicative of the vast amount of work carried on by the large British ship building firms: Harland & Wolff, Belfast ship builders, have at present in hand one steamer 560 feet in length by 60 feet beam for the White Star line; three steamers, 515 feet long by 59 feet beam, for Messrs. F. Leyland & Co., and one 500 feet by 54 feet for the Peninsular & Oriental company, besides several other steamers ranging from 400 feet to 500 feet long.

Major Ruffner of the United States army engineer corps, who is stationed at Buffalo, continues talking of the Chicago drainage canal and declaring that it will greatly lower lake levels. As Major Ruffner is a member of the board of engineers appointed by the secretary of war to investigate the canal question, it would seem that his opinions in advance

of a first meeting of the commission are a little out of order, and it is a wonder that his personal feeling in the matter—due to some question being raised regarding correctness of Niagara outflow data—has not been criticised by the projectors of the canal.

Secretary Carlisle will recommend to congress this year the building of a revenue cutter for the lakes in addition to the boat now under way at the Globe works, Cleveland, and also a first-class 1,200-ton cutter to take the place of the Grant on the New York station. Congress will also provide funds sufficient to complete the cutter for the Pacific coast, for which a large appropriation was made last fall.

On July 1 the iron furnaces of the country were making pig iron at the rate of 171,194 tons per week, against 157,224 tons a month ago, and only 62,517 on July 1 a year ago. The present output is the greatest ever recorded, but it is to be noted that the very light production at this time last year was due largely to the coke strike at that time. Stocks of pig iron on the first of the month amounted to 543,382 tons, against 648,132 tons a month ago and 780,729 tons a year ago.

Trade Notes.

A special number of the San Francisco Commercial News, date of July 1, devotes nearly a page to a description of the steam towing machine manufactured by the American Ship Windlass Company of Providence, R. I. Accounts are given of the successful operation of the machine in different lines on the coast.

Bement, Miles & Co., Philadelphia, manufacturers of machinery, who furnished the Detroit Dry Dock Co. with the equipment for their engine and boiler building shops, are going to open an office in Chicago—No. 1534 Marquette building—with Mr. Charles Billin in charge. Lake shipbuilders in need of first-class machinery will do well to consult this company before buying, as a difference of a few years in the life of a planer is an important item, and the facility with which machines of this company handle work is also a matter of more importance than slight difference in price.

They Were All Below.

One of the tragedies of the ocean that seldom gains notice in the public press was illustrated in the loss of the steamer Colima, recently, on the Pacific coast. Not one of the engineer force was saved. When the call brought all of that force on duty, each man went below, and from the chief to the stokers, all were at their posts, showing a calm bravery hardly to be appreciated even by those who in pleasant weather have visited the lower regions of an ocean steamer. Far below the water line, they worked heroically to save others, knowing full well that their chances of being saved were as one out of one hundred. The devotion to duty, the heroism that enables a man, who on deck may save himself, to go below to almost certain destruction, requires the highest type of manhood. All honor to the brave engineers who sacrificed their lives in the vain hope of saving the Colima.—San Francisco Commercial News.

The Peninsular & Oriental Steam Navigation Co., a British corporation, has forty-nine steamers in commission and seven building. The smallest of the steamships is of 2,996 tons register, and with this exception all the forty-nine vessels are over 3,000 tons each, while thirty-three of them are over 4,000 tons, including thirteen of over 5,000 tons each. The largest of the fleet is the Caledonia, which is 7,558 tons and 11,000 horse power effective. In addition to this fleet there are a number of steam tugs and launches of nearly 2,000 tons in the aggregate, so that the total tonnage owned by the company is 265,100—that is with the 40,100 tons building. The fleet is kept efficient by the disposal of the older types of steamers. In little more than a year ten such steamers have been disposed of.

James Corrigan of Cleveland, whose interests are divided between iron ore, vessels and pig iron, is of the opinion that the vessel business is very liable to be overdone. He says he would rather build an iron furnace than a vessel at this time.

The Nickel Plate road has compiled a list of country homes along the south shore of Lake Erie, willing to accommodate summer boarders, and a copy will be mailed to any address by enclosing a stamp to any agent of the Nickel Plate road, or to B. F. Horner, general passenger agent. Aug. 31—265

OFFICE OF LIGHT HOUSE ENGINEER,
Ninth District, Detroit, Mich., July 5, 1895.
Sealed proposals will be received at this office until 3 o'clock p. m. of Thursday, the 1st day of August, 1895, for furnishing the materials and labor of all kinds necessary for the complete construction, erection and delivery of the Buoy Shed, Platform, Tramway, and Derrick for Light-House Depot, St. Joseph, Mich. Plans, specifications, forms of proposal, and other information may be obtained on application to this office. The right is reserved to reject any or all bids, and to waive any defects. **M. B. ADAMS,** Major, Corps of Engineers, U. S. A., Light-House Engineer. July 19



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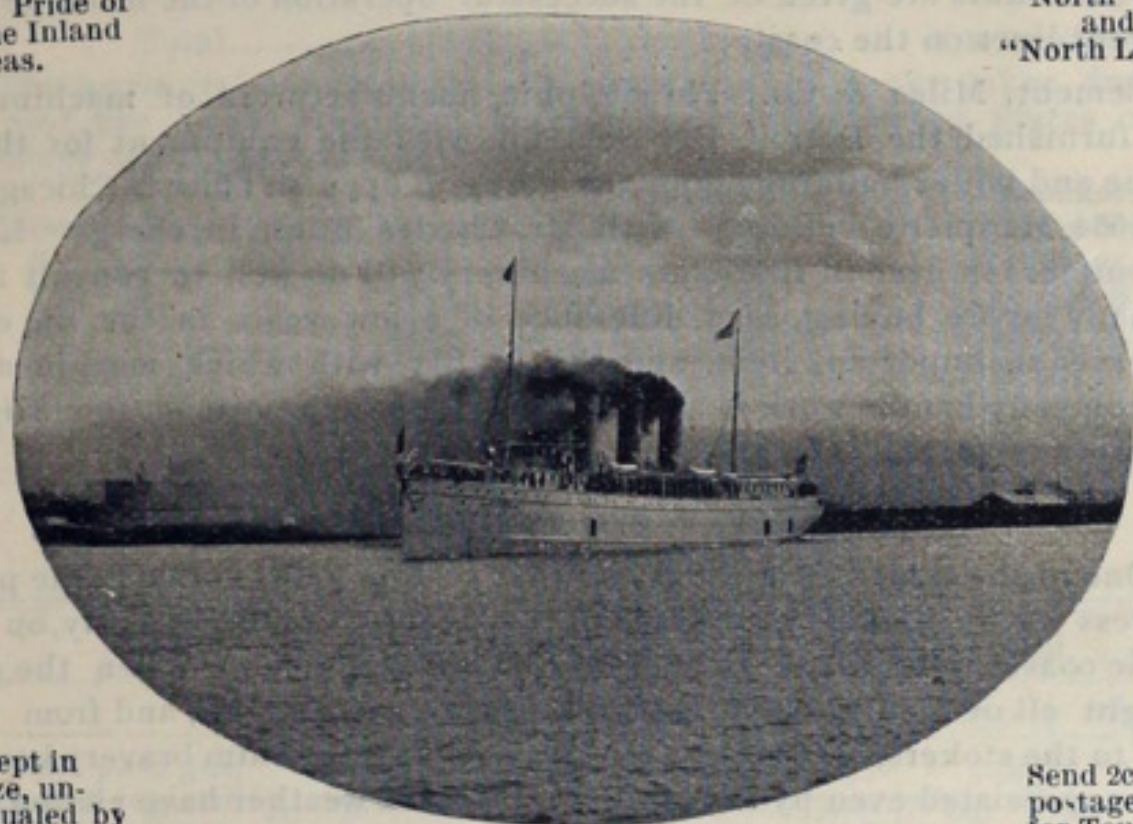
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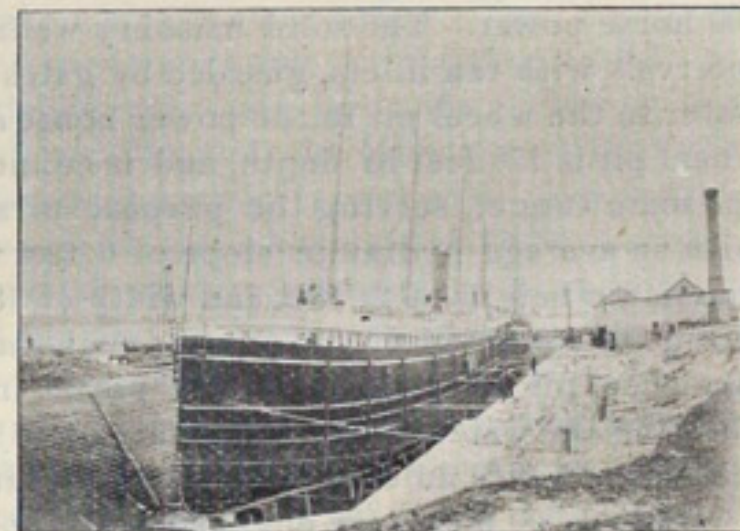
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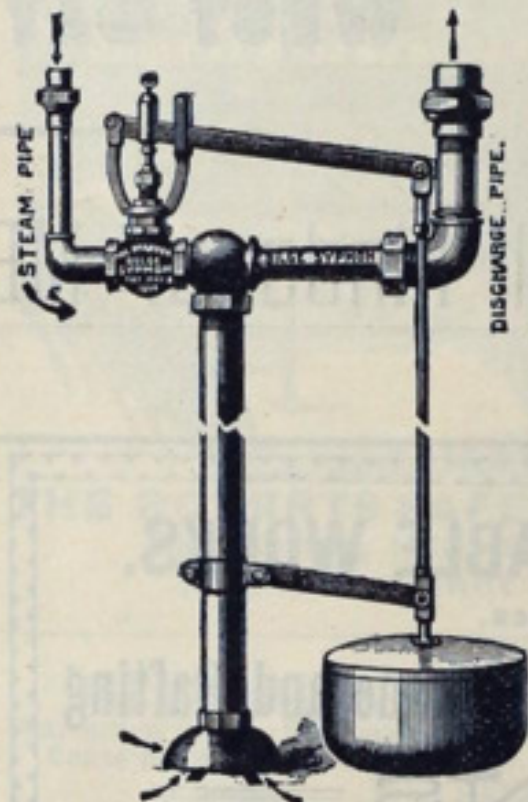
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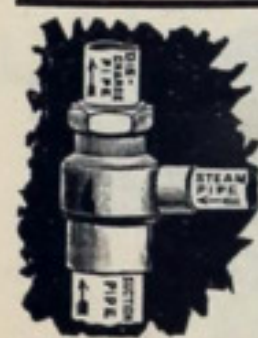
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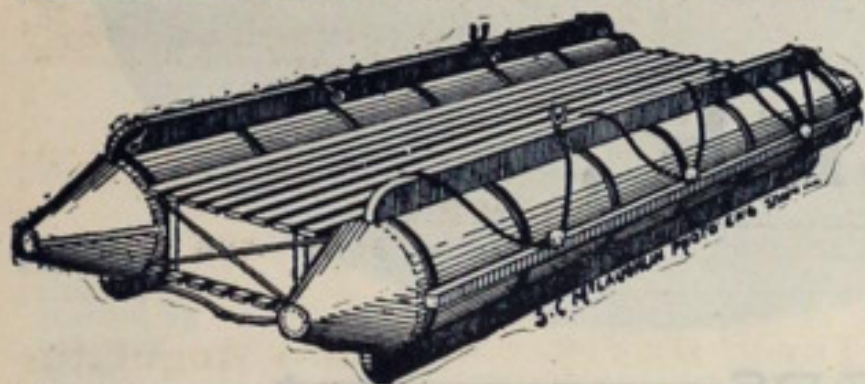
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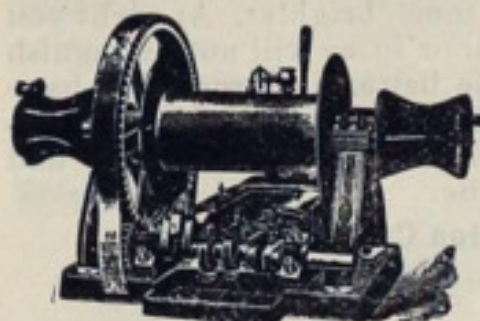
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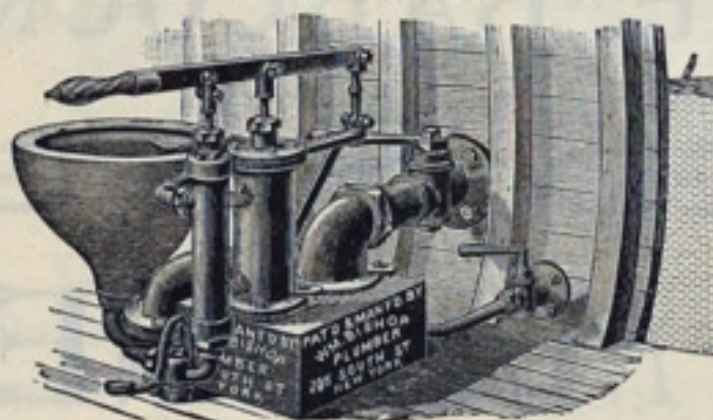
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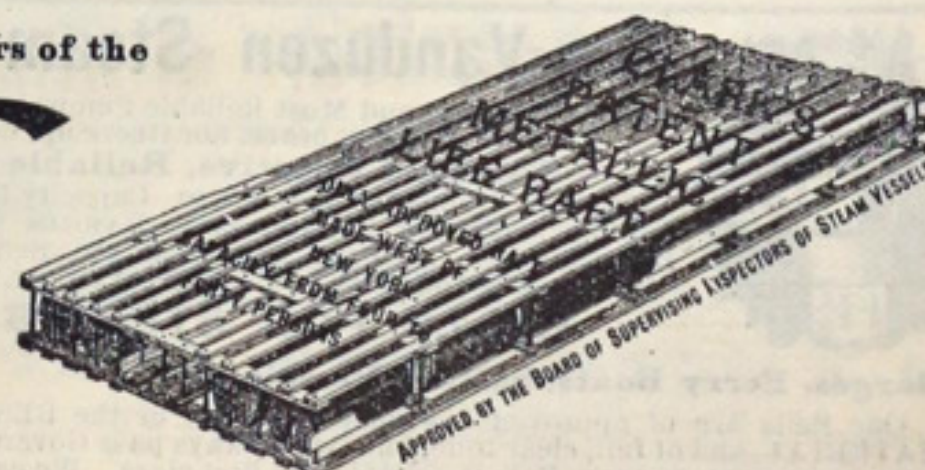
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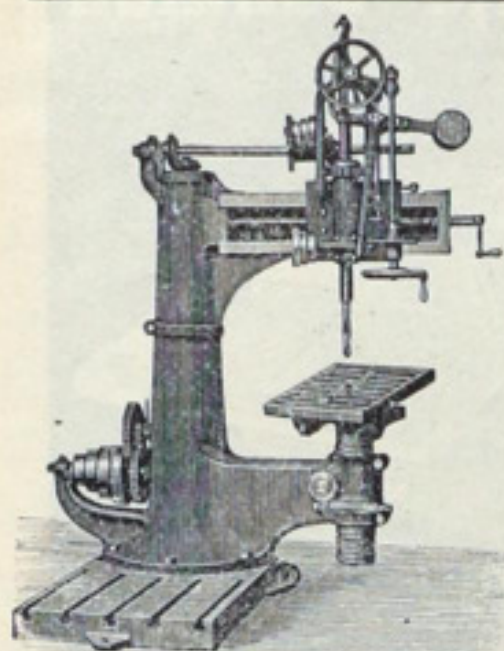
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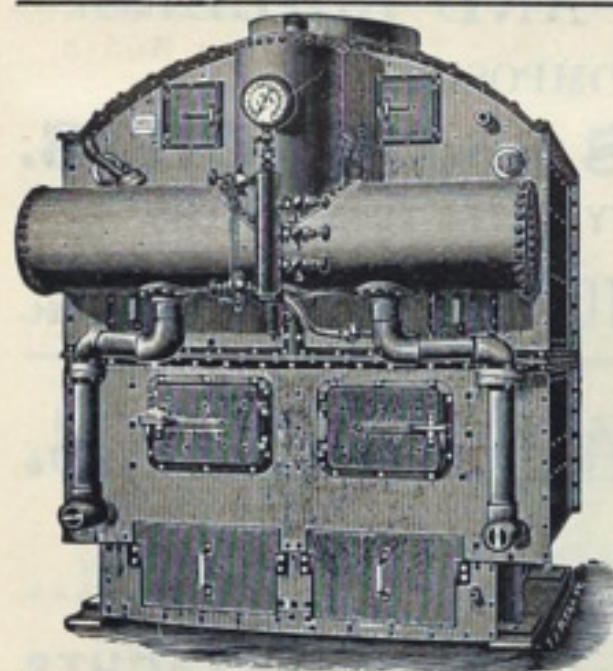
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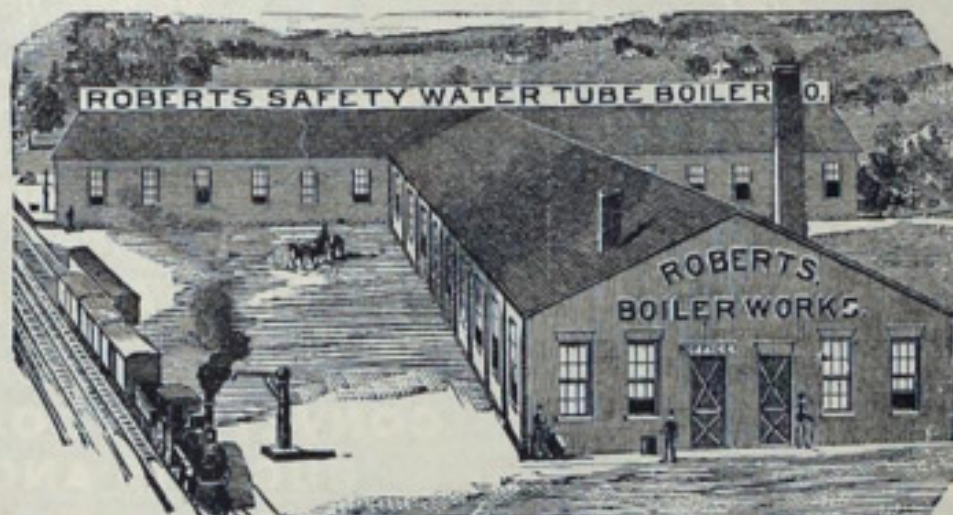
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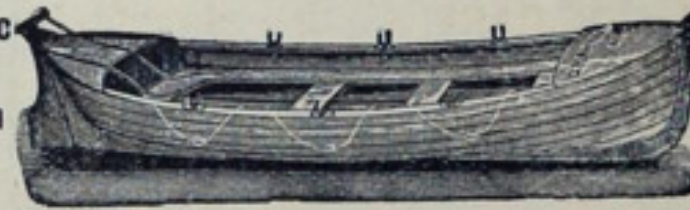
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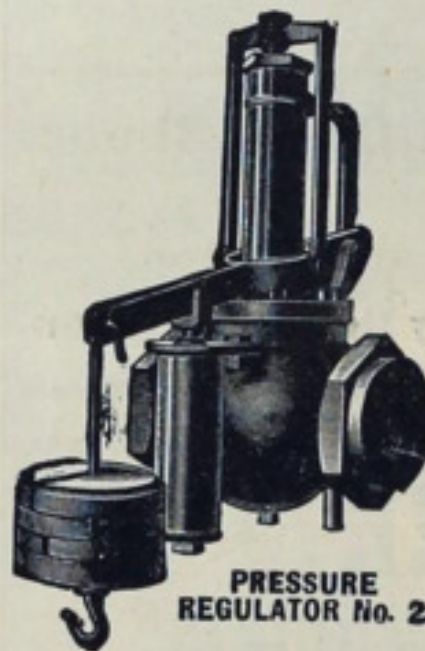
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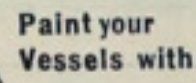
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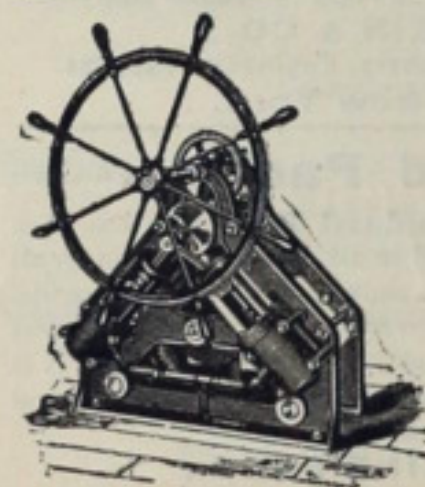
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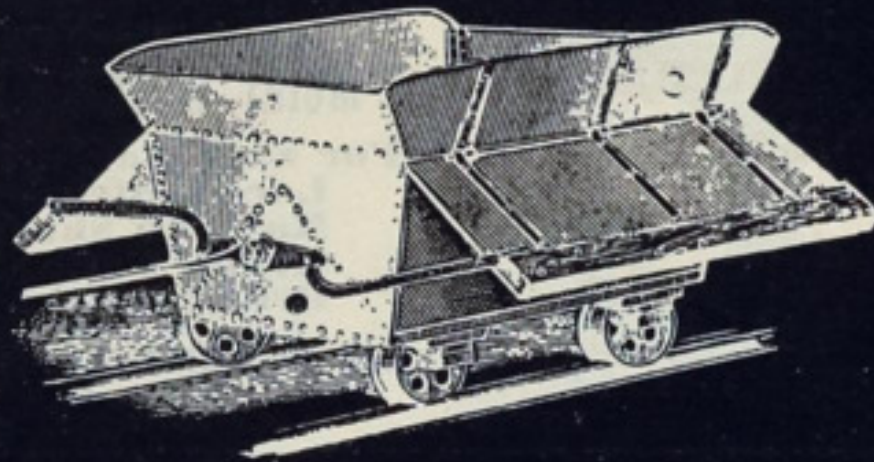
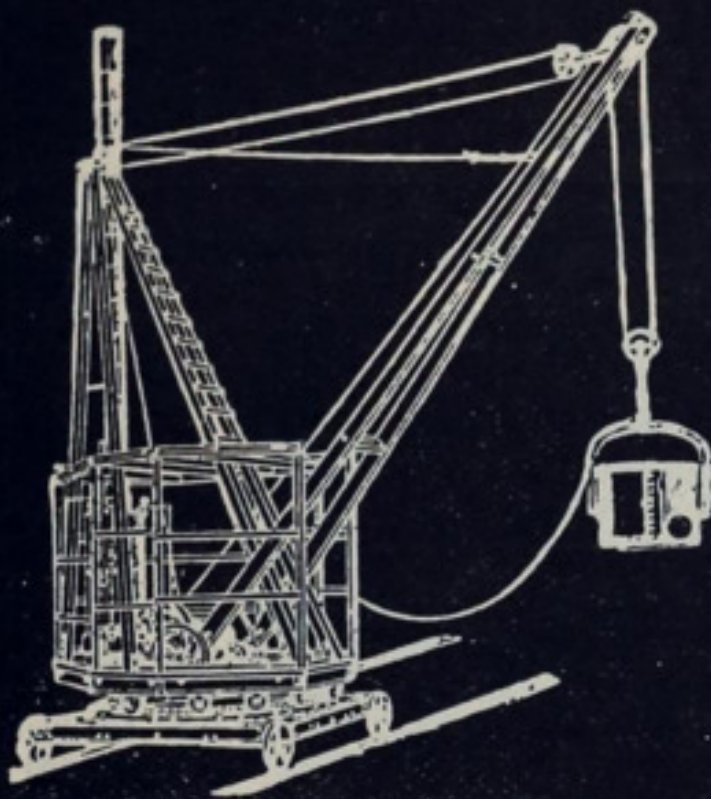
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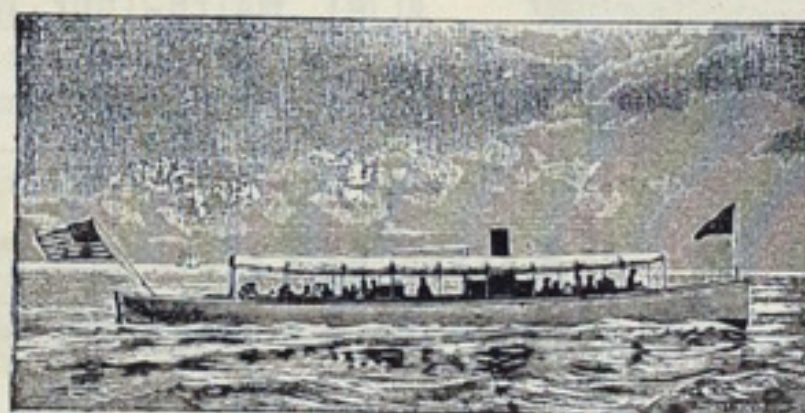
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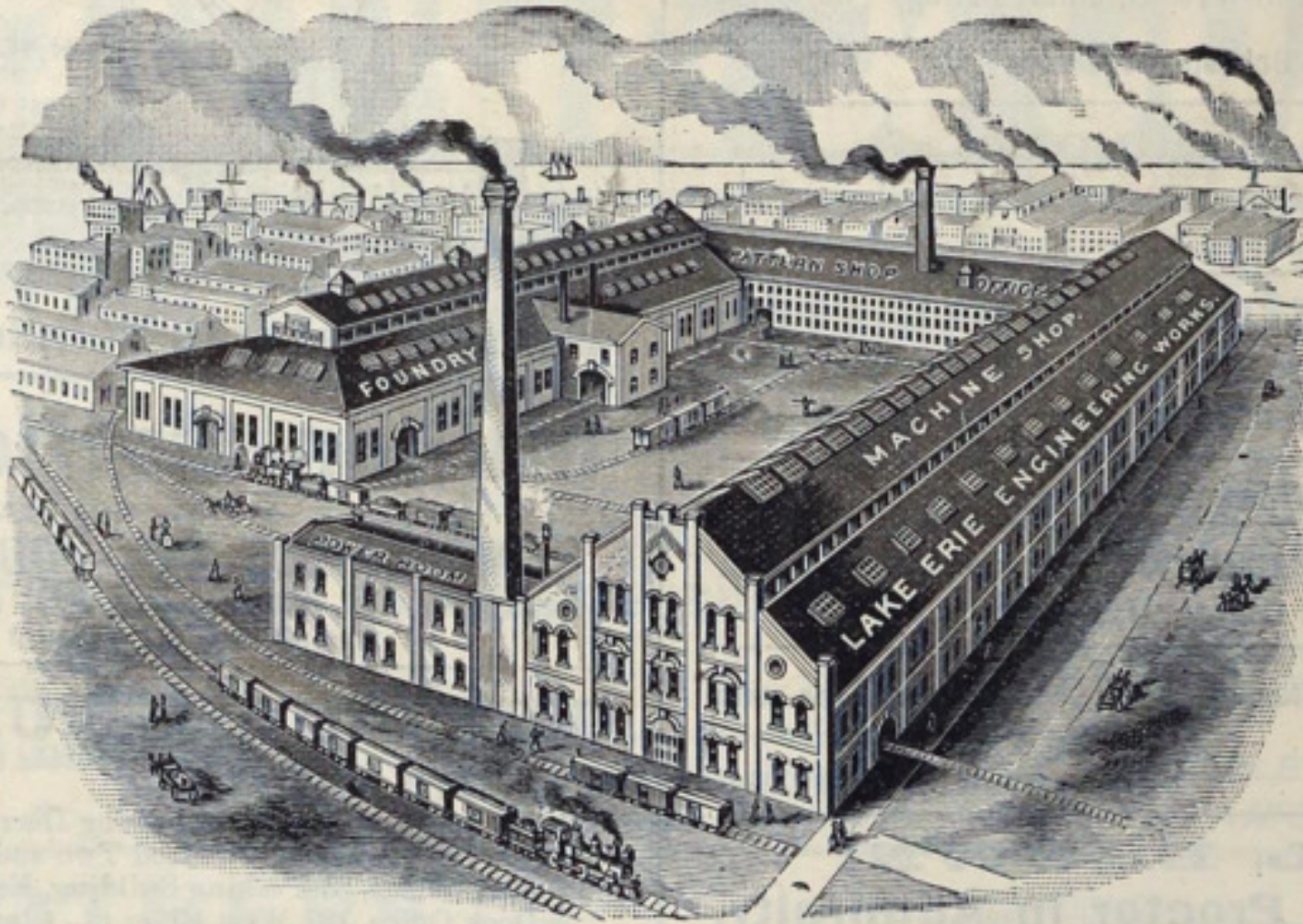
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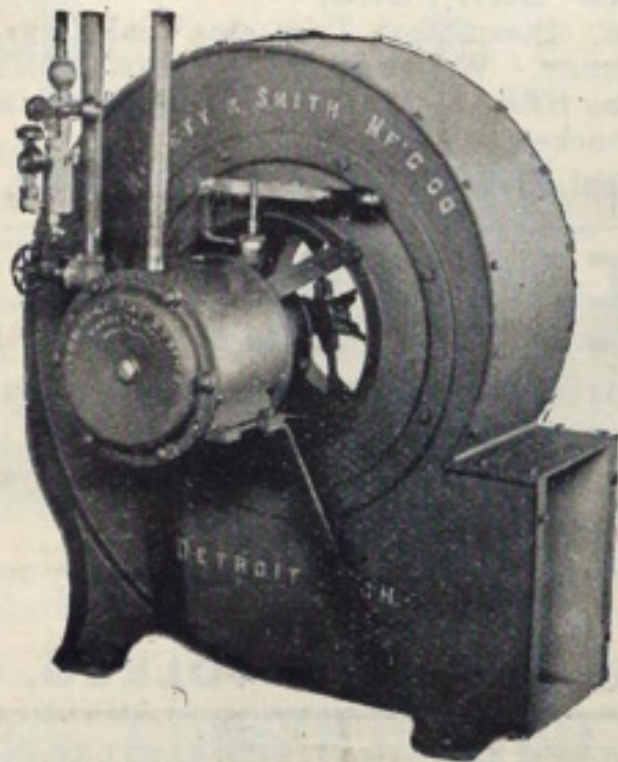
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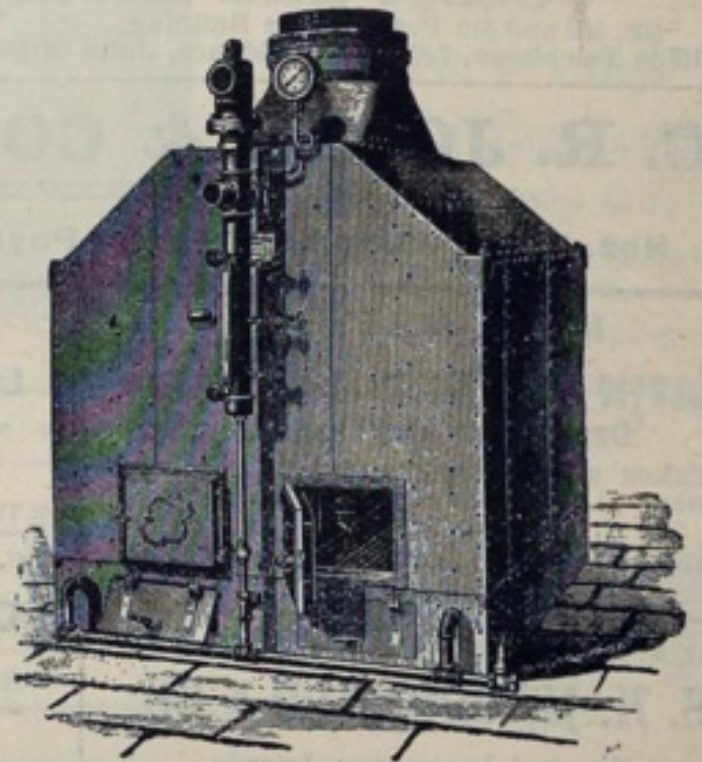
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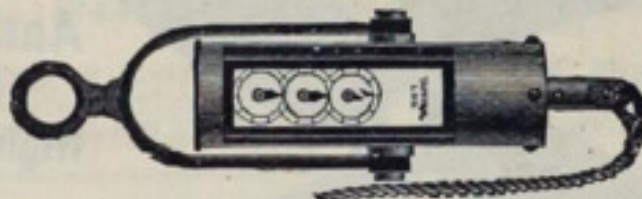
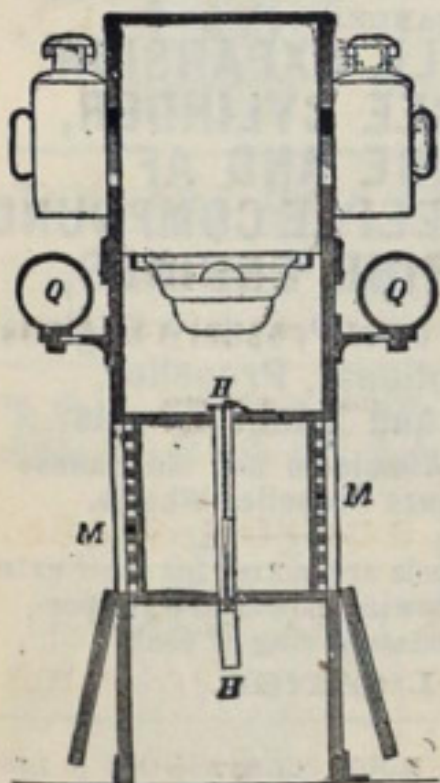
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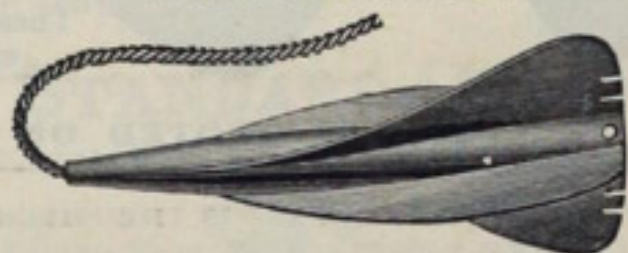
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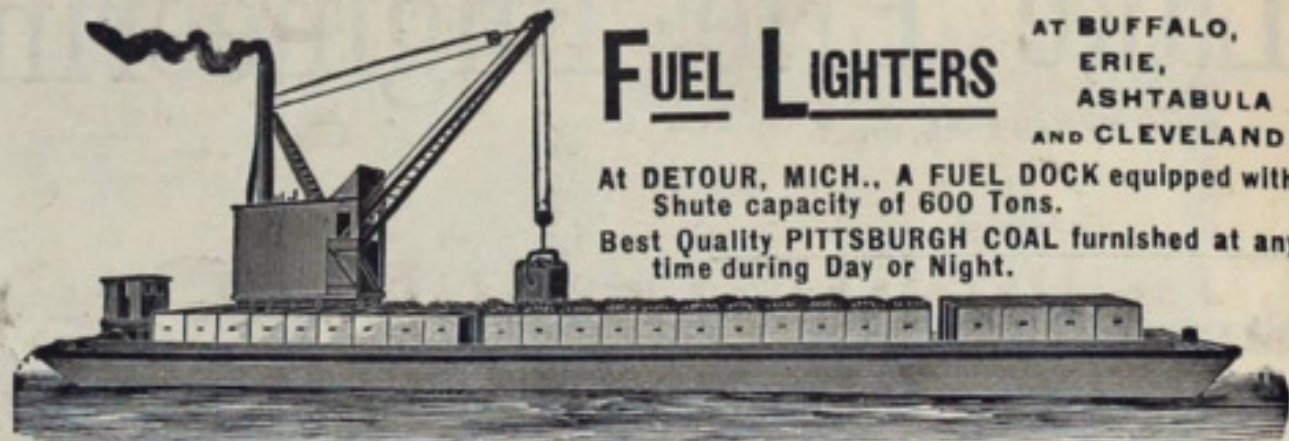
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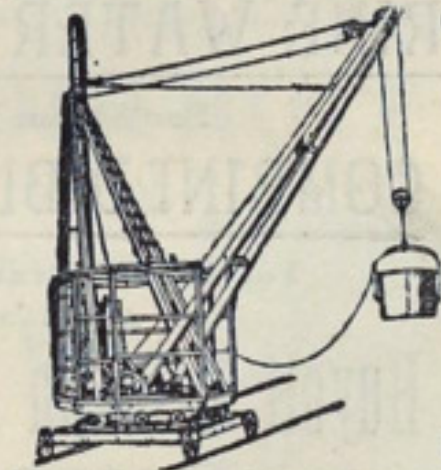
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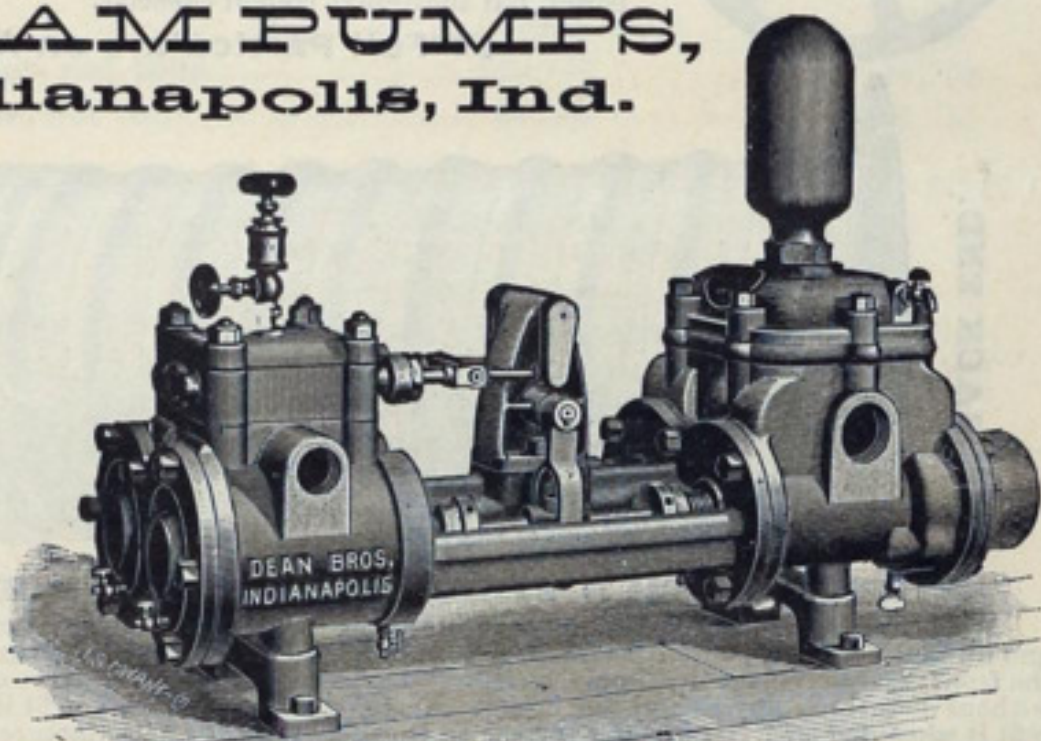
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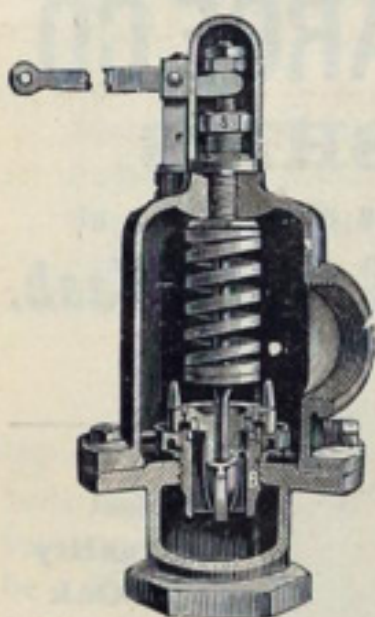
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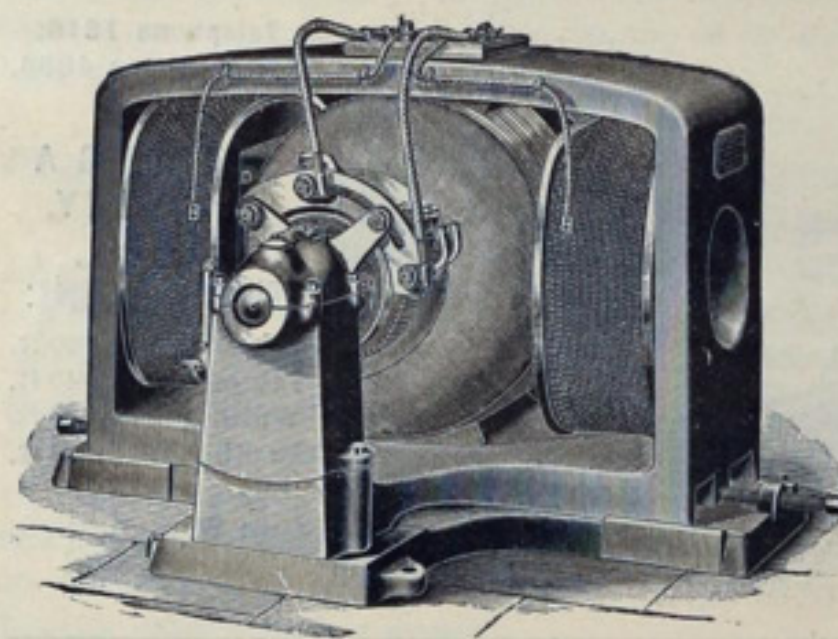
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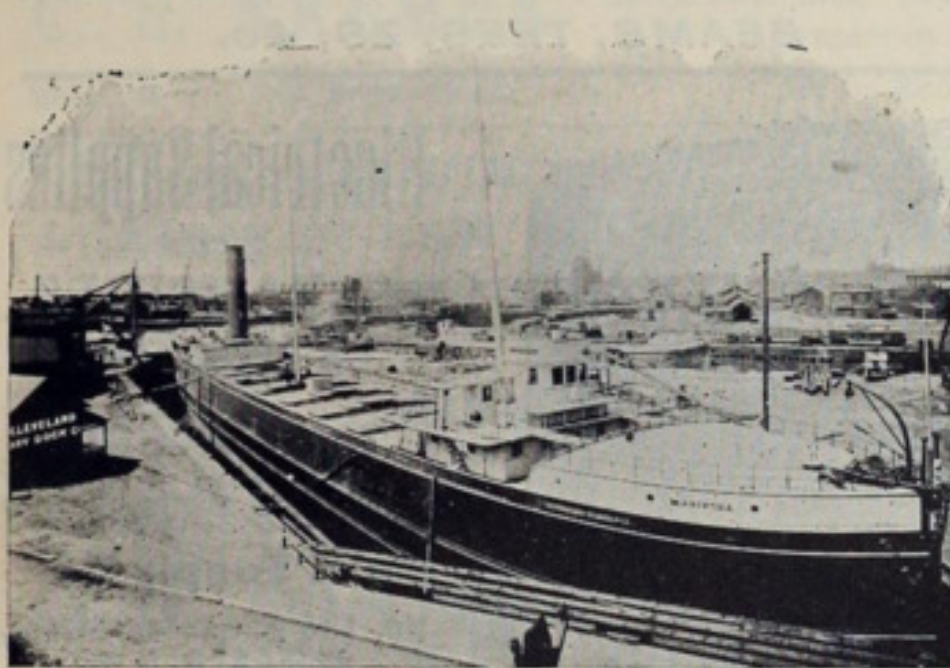
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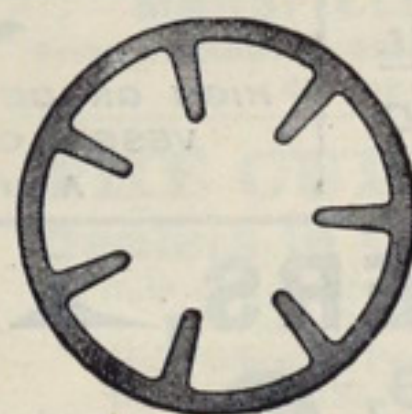


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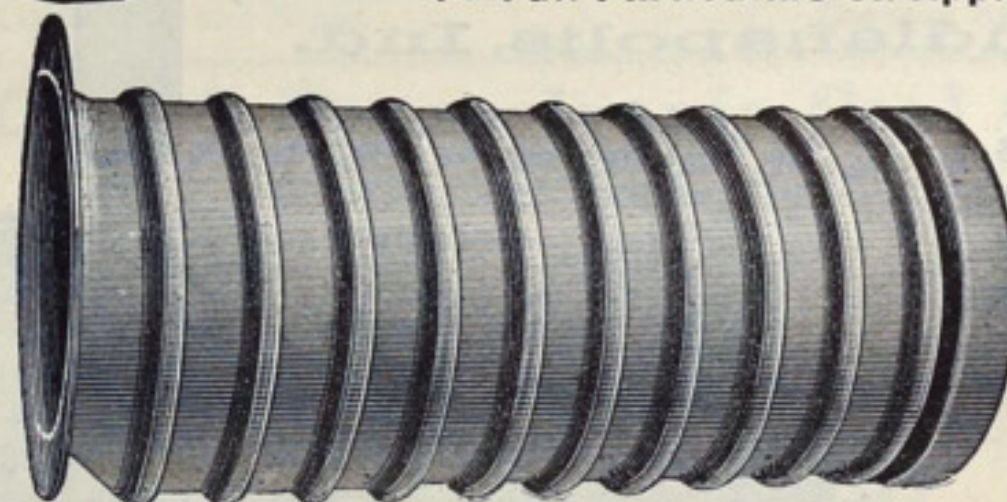
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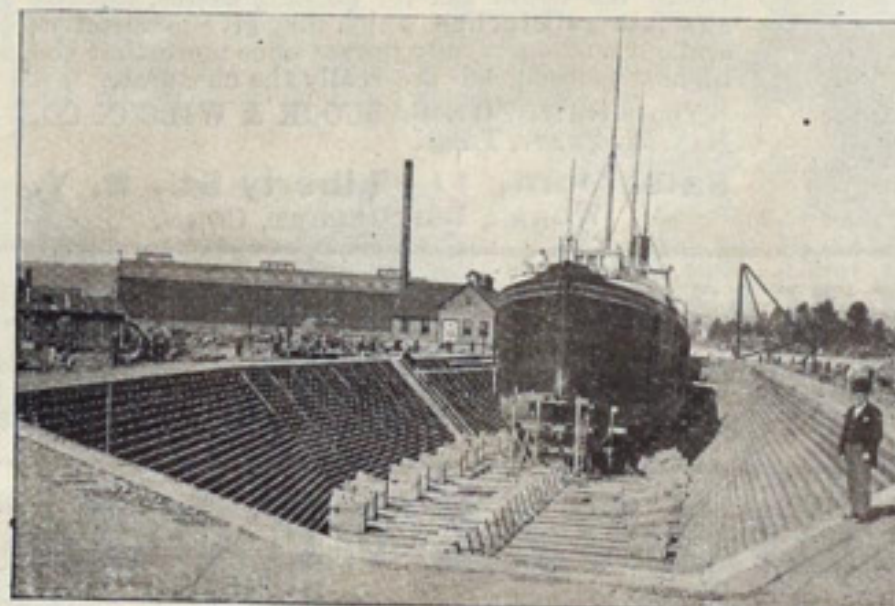
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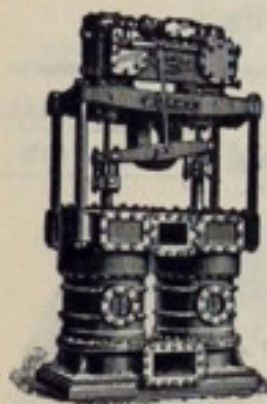
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